Lower Cottonwood Kickoff/Working Group Workshop

Lower Cottonwood Watershed RiskMAP Project

KDA - Division of Water Resources

Kansas
Department of Agriculture

THANK YOU FOR COMING!

- This meeting is the Kickoff to a project to replace the remaining invalid floodplain mapping in the Lower Cottonwood Watershed.
- Community participation is important because the results of **this project will affect your communities for many years – even decades!**
- **Working Groups are not required.** Manage your groups as you see fit.
- **This should be informal and interactive.**

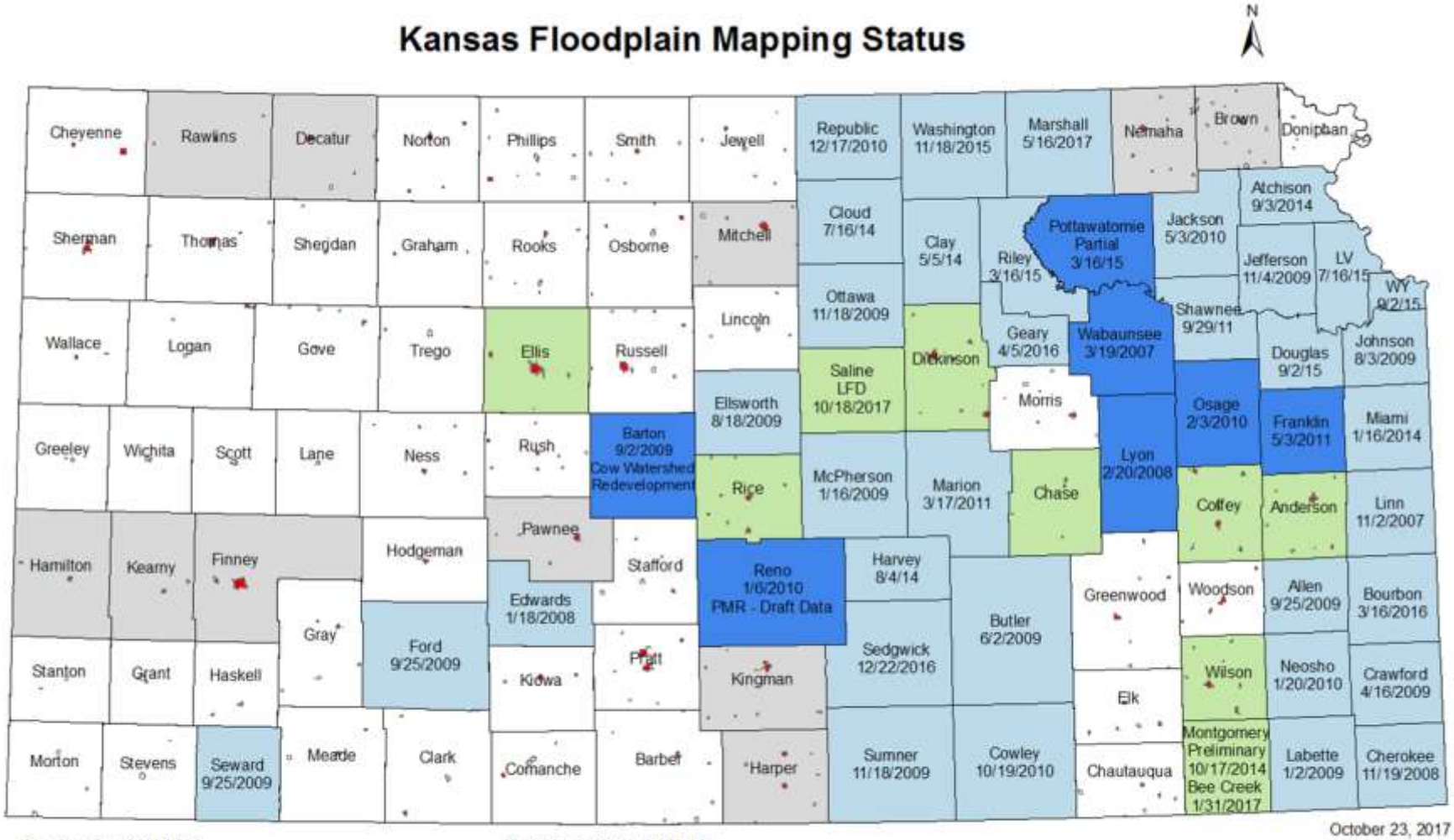
AGENDA

- Intro
- Floodplain Mapping 101
- Project Overview
- Project Timeline
- Working Group Tasks
- Q&A

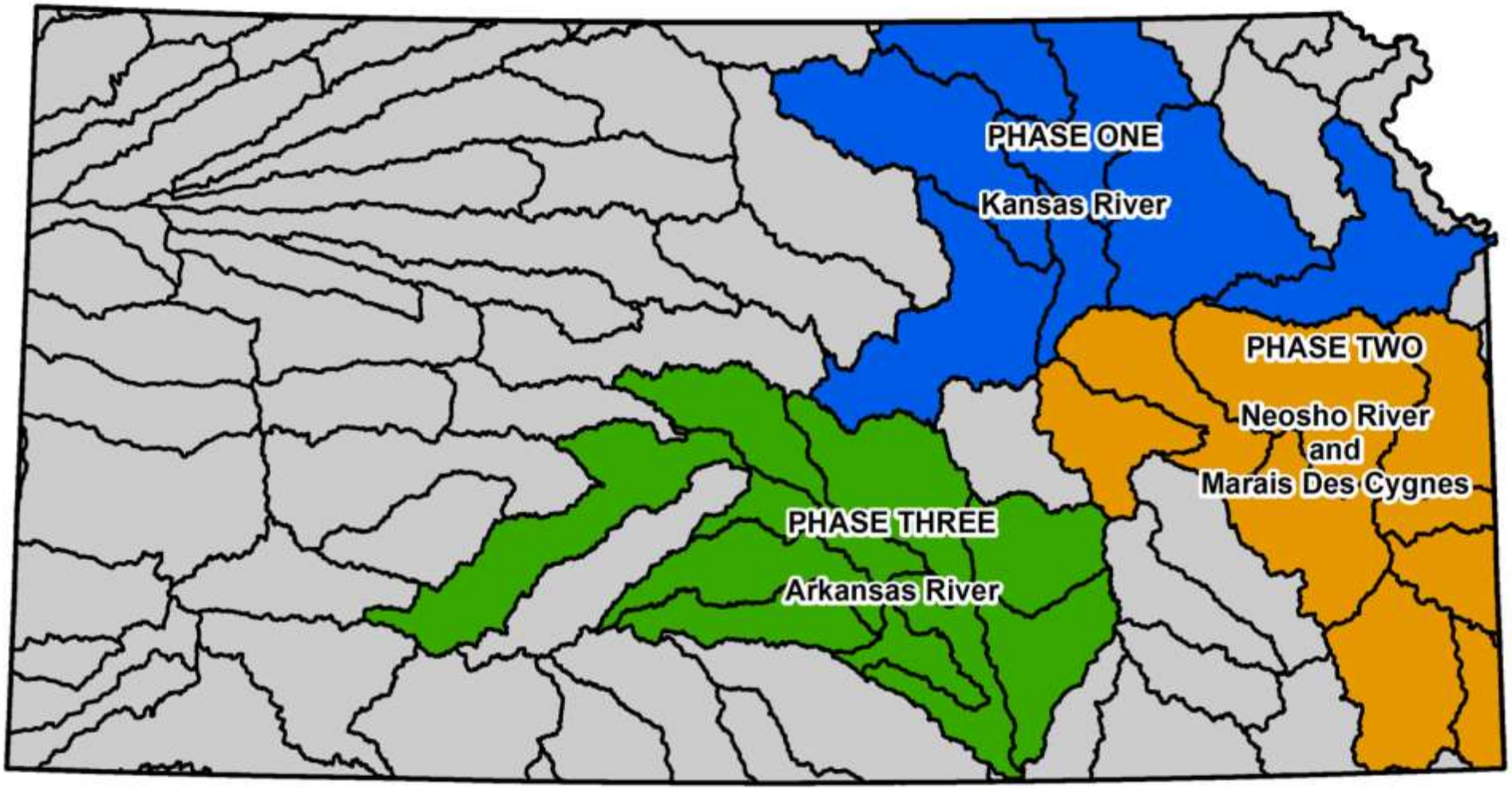
WHY?

- Watershed "Discovered" in 2015 and 2017
  - Discovery Meeting – April 3, 2015 – Cottonwood Falls
  - Discovery Meeting – February 28, 2017 - Emporia
- Outdated Engineering
  - LiDAR (Lyon County)
  - DFIRM Needed (Chase County); 796 'paper' stream miles
  - 77% Invalid in CNMS (FEMA database)
- Fits into our Risk MAP phased approach

Kansas Floodplain Mapping Status



RiskMAP Phased Approach



WHY? – Purpose Of Project

- Determine where flood insurance is needed and rate its cost.
  - Flood Insurance Rate Map (FIRM)
- To provide the basis for executing community floodplain management ordinances.
- Understand flood risk so communities can make informed planning decisions.

What Is Risk MAP?

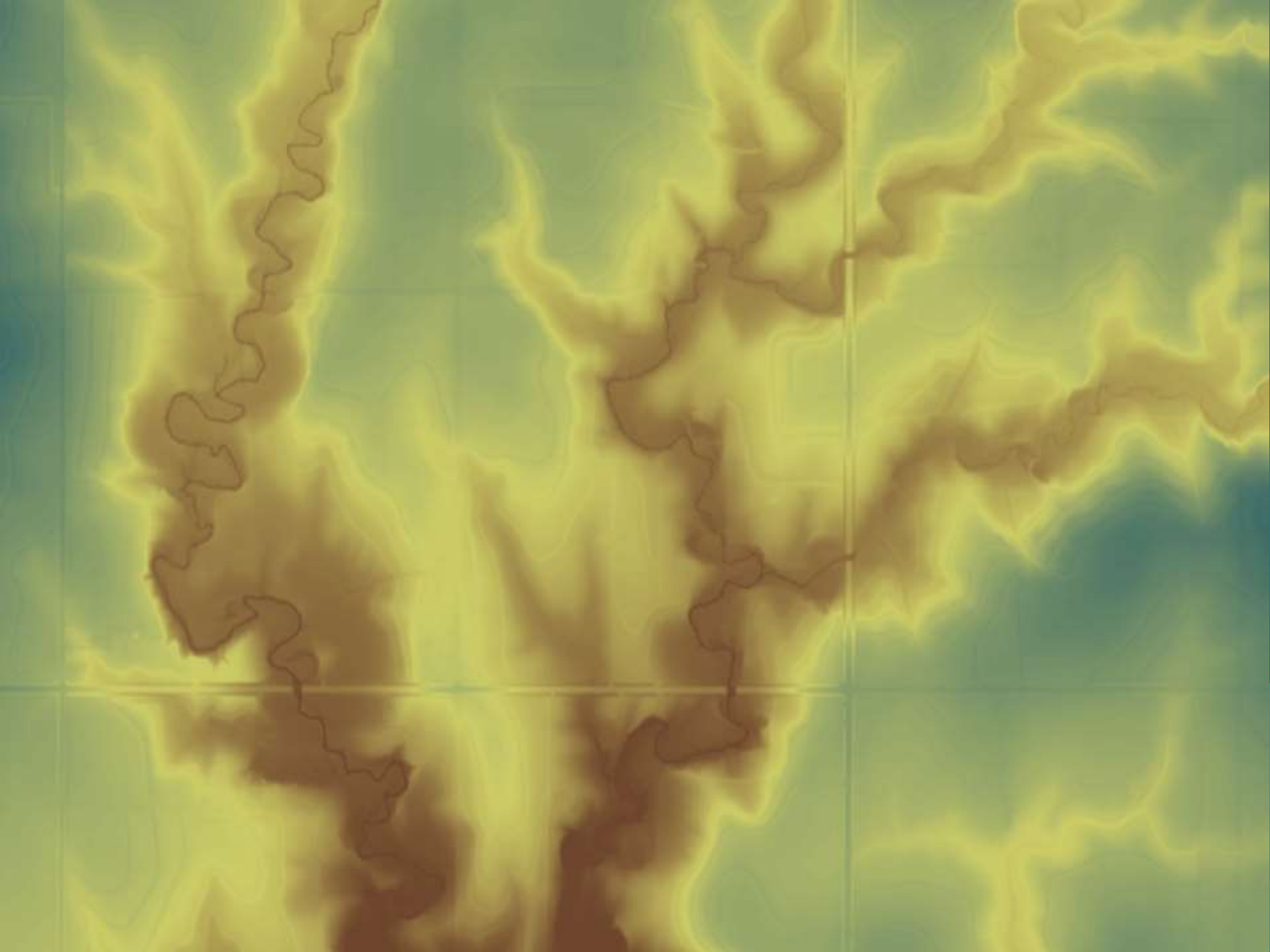
- Mapping, Assessment, and Planning
- Federal Emergency Management Agency (FEMA) program
- Provides communities with flood information and tools to:
  - Enhance mitigation plans
  - Guide land use & development planning
  - Identify areas in need of mitigation
- Ounce of prevention….

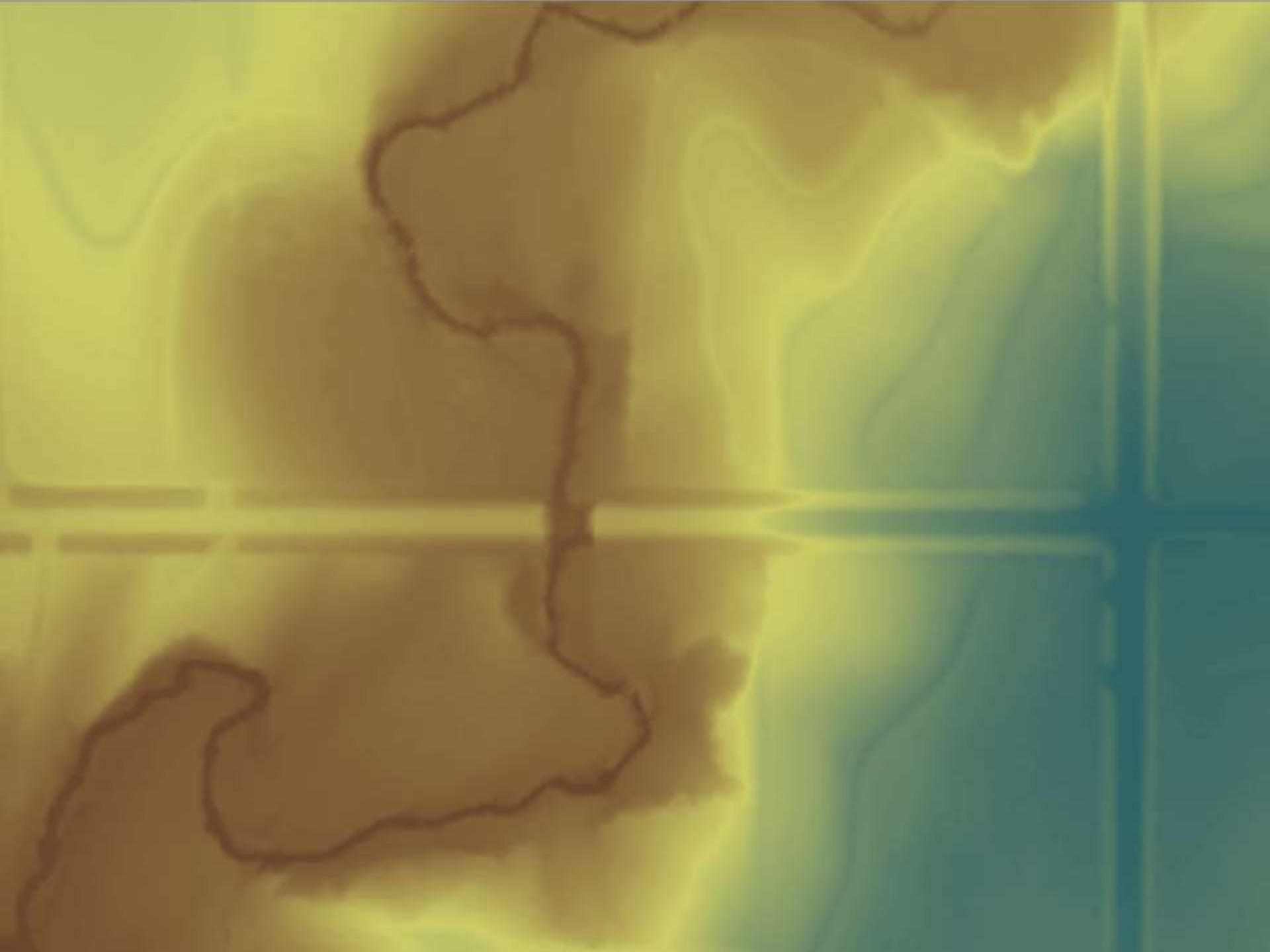
Why Working Groups?

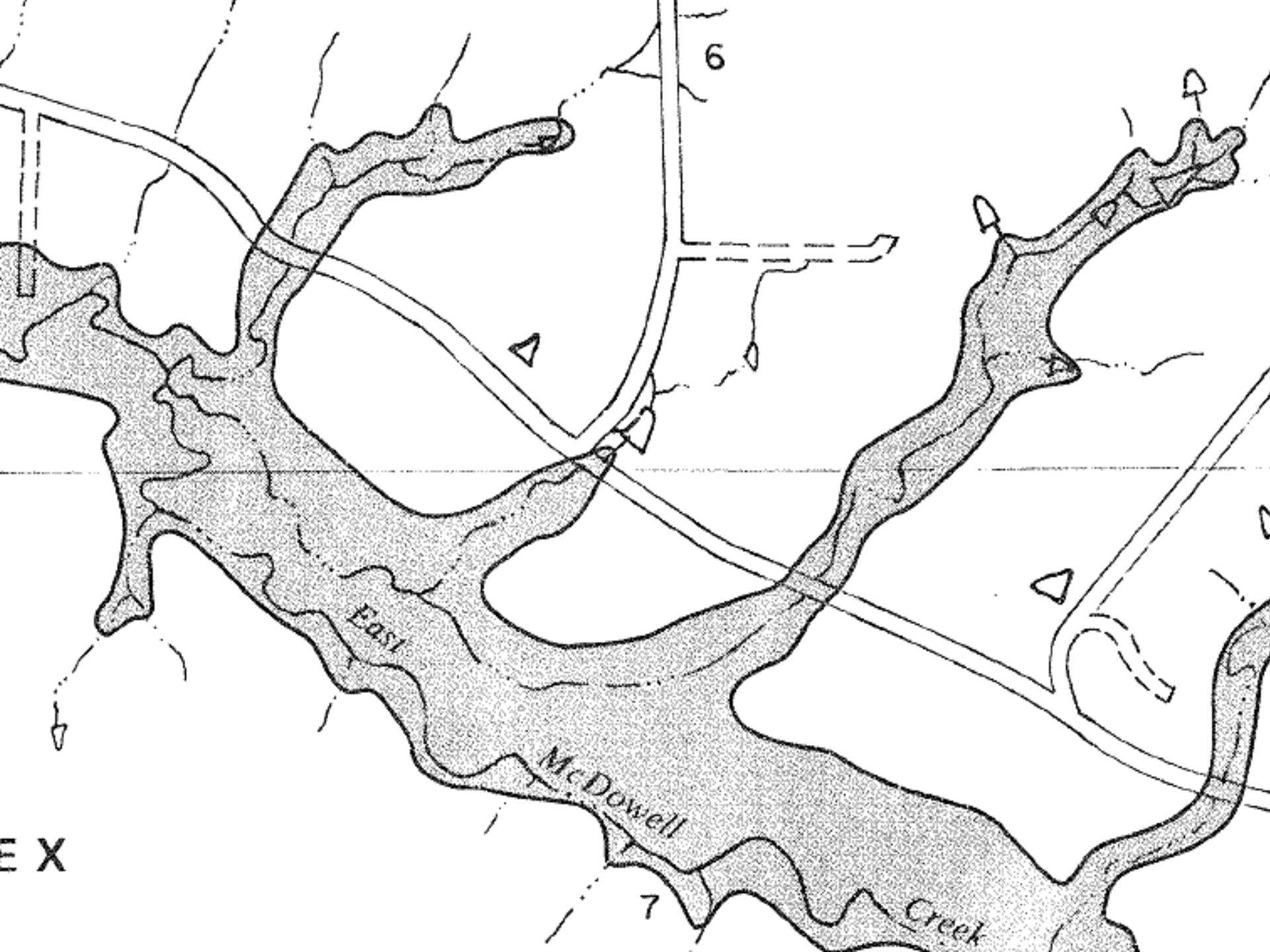
- To ensure your community is represented
- To ensure your residents are aware
- To make the best map possible
- To provide local knowledge and input
- To address problems or inaccuracies early
- To ensure YOU BELIEVE THE MAP
- To work towards mitigating risk
- To improve floodplain management locally

How Will This Map Be Different?

- All New Engineering
  - Buck Creek, Cedar Creek, Cottonwood River, Fox Creek, Fox Creek Tributary, Middle Creek, Spring Creek, Emporia E. and W. Unnamed Tributaries
  - Over 1,090 sq. miles of hydrologic study
- LiDAR Topography
  - 10X greater accuracy
- Non-Regulatory Products
  - Changes Since Last FIRM
  - Areas of Mitigation Interest
  - Flood Depth Grids
  - Risk Assessment Data



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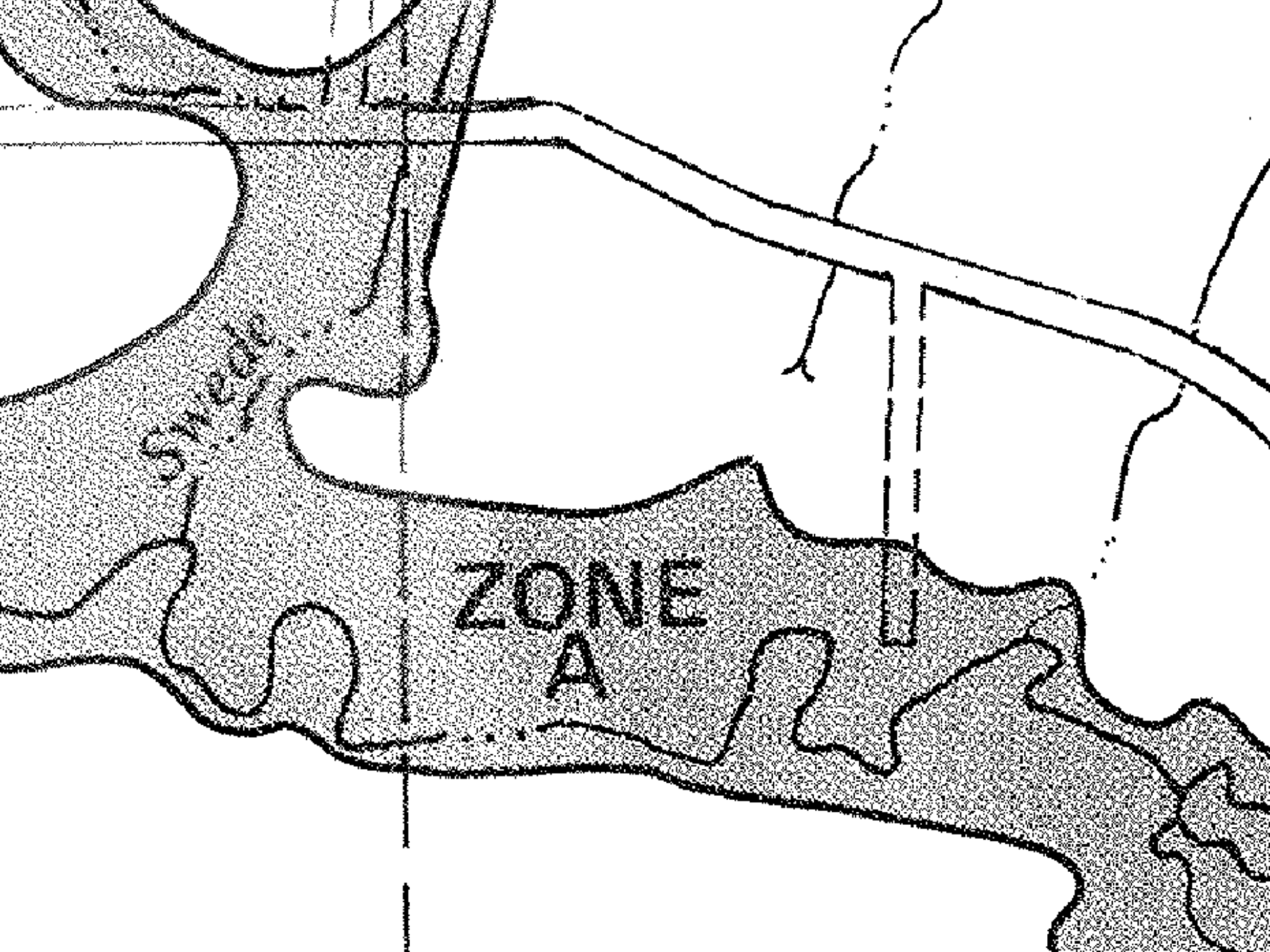
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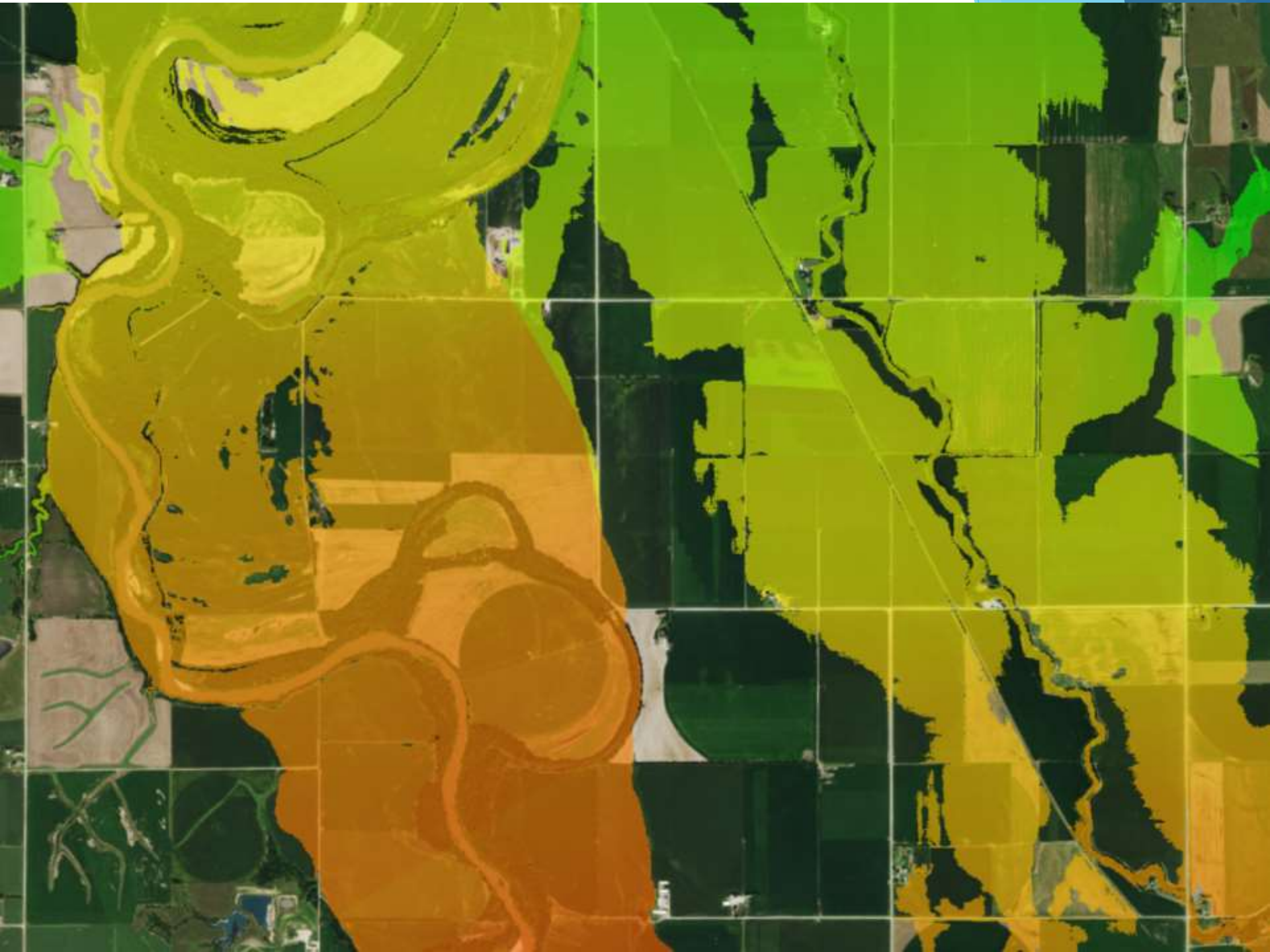
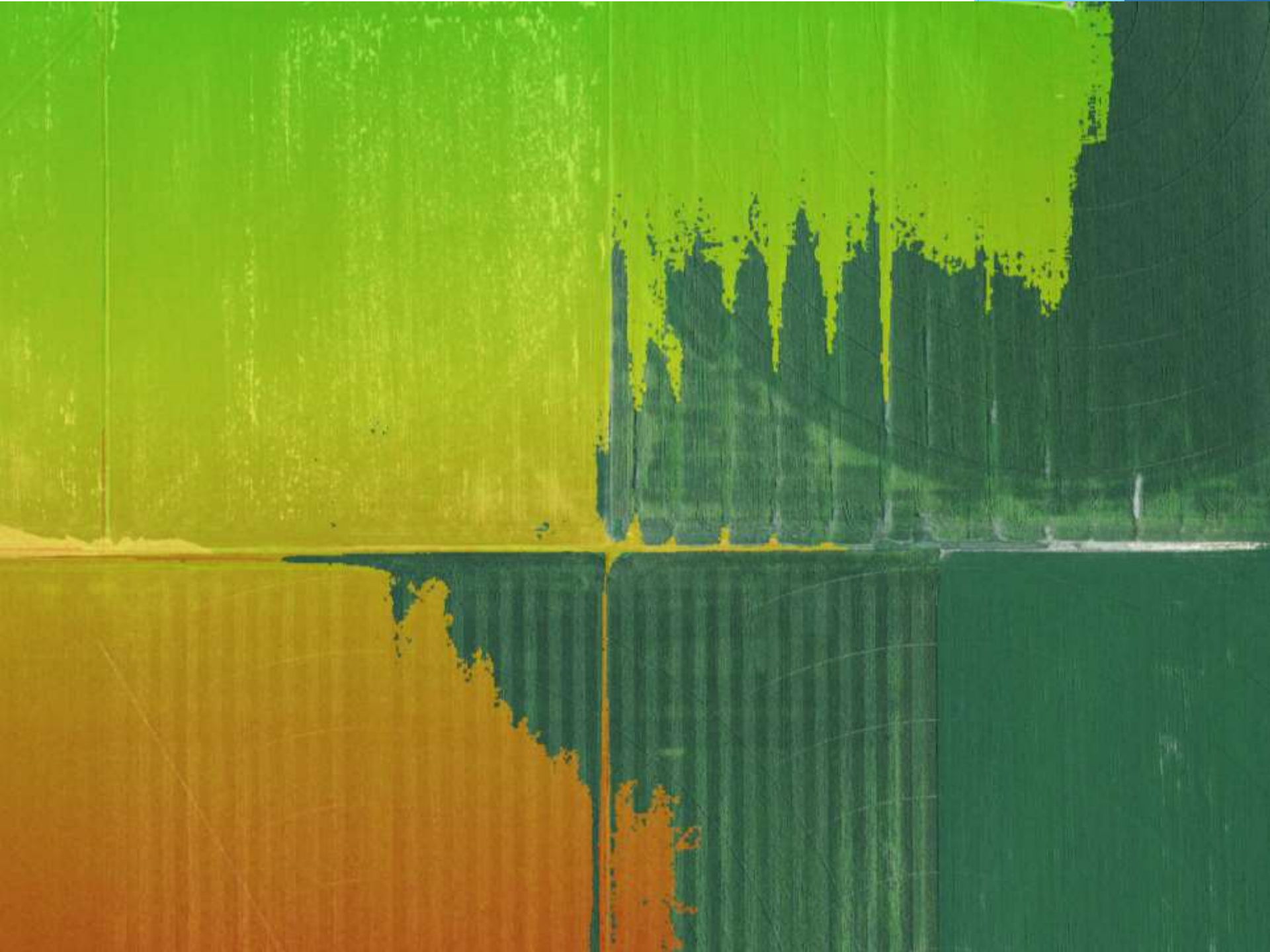
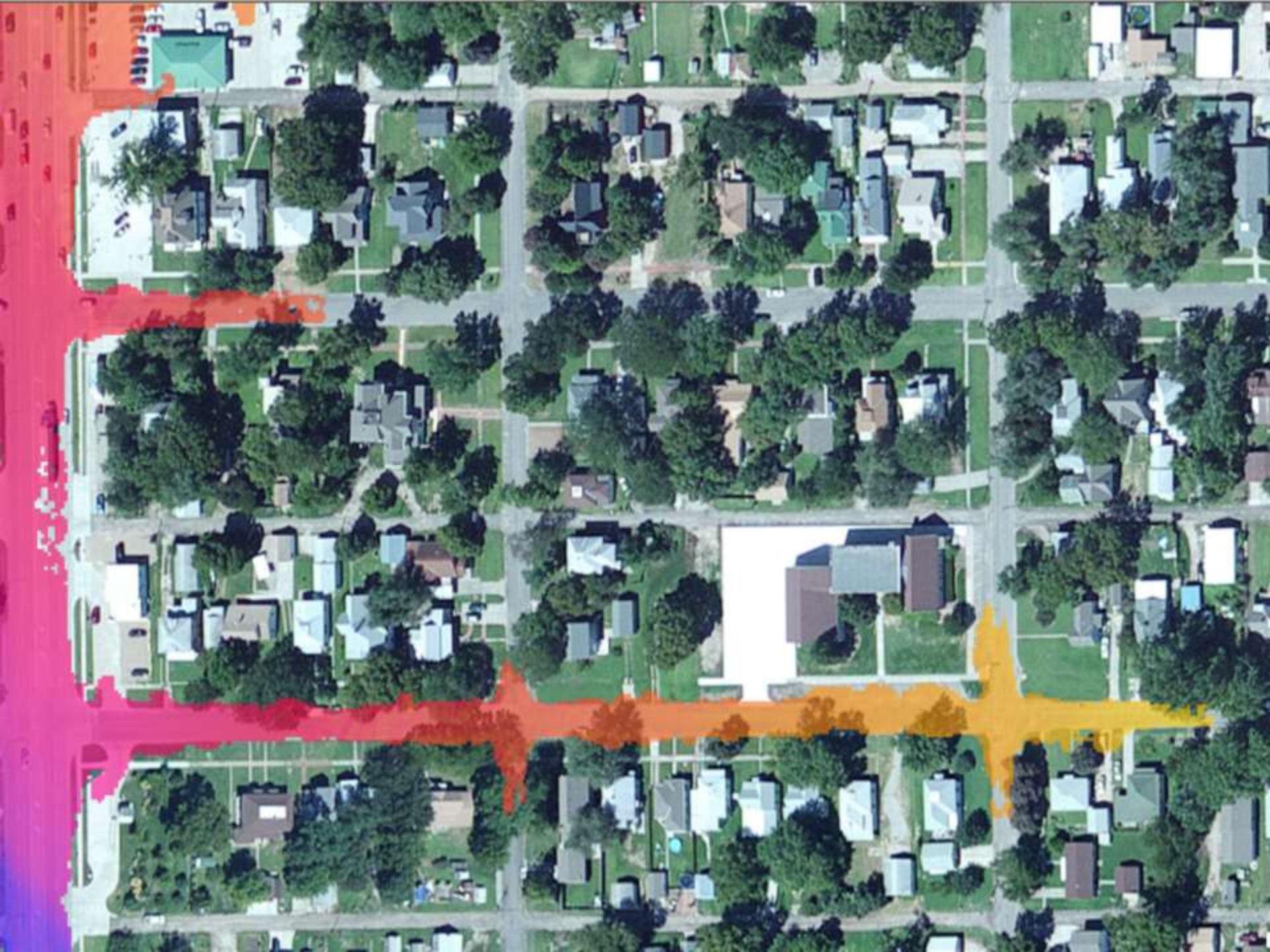






Floodplain Mapping 101

Data Development Tasks

- Acquire Base Map
- Acquire Topography
- Perform Field Survey
- Develop Hydrologic Data (Hydrology)
- Develop Hydraulic Data (Hydraulics)
- Perform Floodplain Mapping
- Develop DFIRM Database

Hydrology

(How Much Water)

The Hydrology study determines the peak discharge for the 10%, 4%, 2%, 1%, 1% (+/-) and 0.2% annual chance events - how much water (CFS) is flowing down the stream during the flood.

Hydrology Methods

Detailed Hydrology:

- **Gage Analysis**
  - Statistical analysis of a stream's flow history.
  - What has happened in the past.
- **Rainfall Runoff Modeling**
  - Models that mimic the characteristics of a watershed.
    - NWS Rainfall History
    - Infiltration (soils, pervious surfaces)
    - Storage (dams or other sinks)
    - Timing / Routing (how fast does water get from A to B)
    - HEC-HMS (software used for hydrologic modeling)

Hydrology Methods

- **Approximate Hydrology:**
  - **Rainfall Runoff Modeling**
  - Models that mimic the characteristics of a watershed.
    - NWS Rainfall History
    - Infiltration (soils, pervious surfaces)
    - Storage (dams or other sinks)
    - Timing / Routing (how fast does water get from A to B)
    - HEC-HMS (software used for hydrologic modeling)

Hydraulics

How High The Water Will Get

The Hydraulic study determines the water surface elevations on streams during the 10%, 4%, 2%, 1%, 1% (+/-) and 0.2% events.

It models the interaction between the water and the channel/ground surface to determine where water goes and what the floodplain boundaries will be.

Hydraulics

2 types of modeling will be used:

1-Dimensional and 2-Dimensional

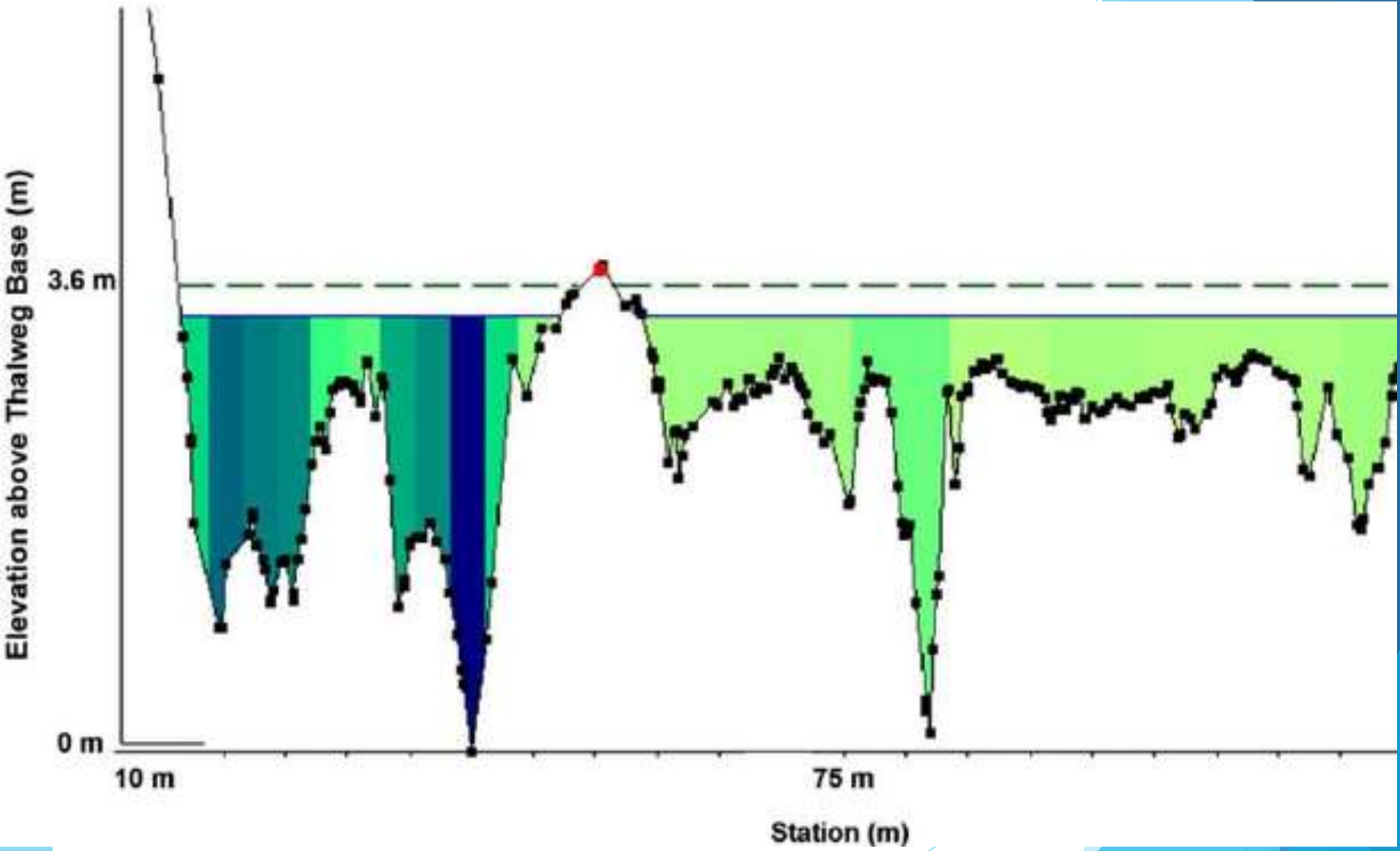
Modern computer models consider variables affecting water flow:

- Slope, Friction, Structures (culverts and bridges)(detailed studies), Sinuosity, Areas of Non-Conveyance (ineffective flow)

Hydraulics

Detailed Hydraulics:

- Cross Sections of stream channels are developed at regular intervals along streams, and at locations where the channel varies or changes
- Survey information for structures (culverts and bridges) is included in the modeling
- Variables that will affect the conveyance of water are considered in the model
  - Slope, Friction, Sinuosity, Areas of Non-Conveyance (ineffective flow)


Elevation above Thalweg Base (m)
3.6 m
0 m
10 m
75 m
Station (m)

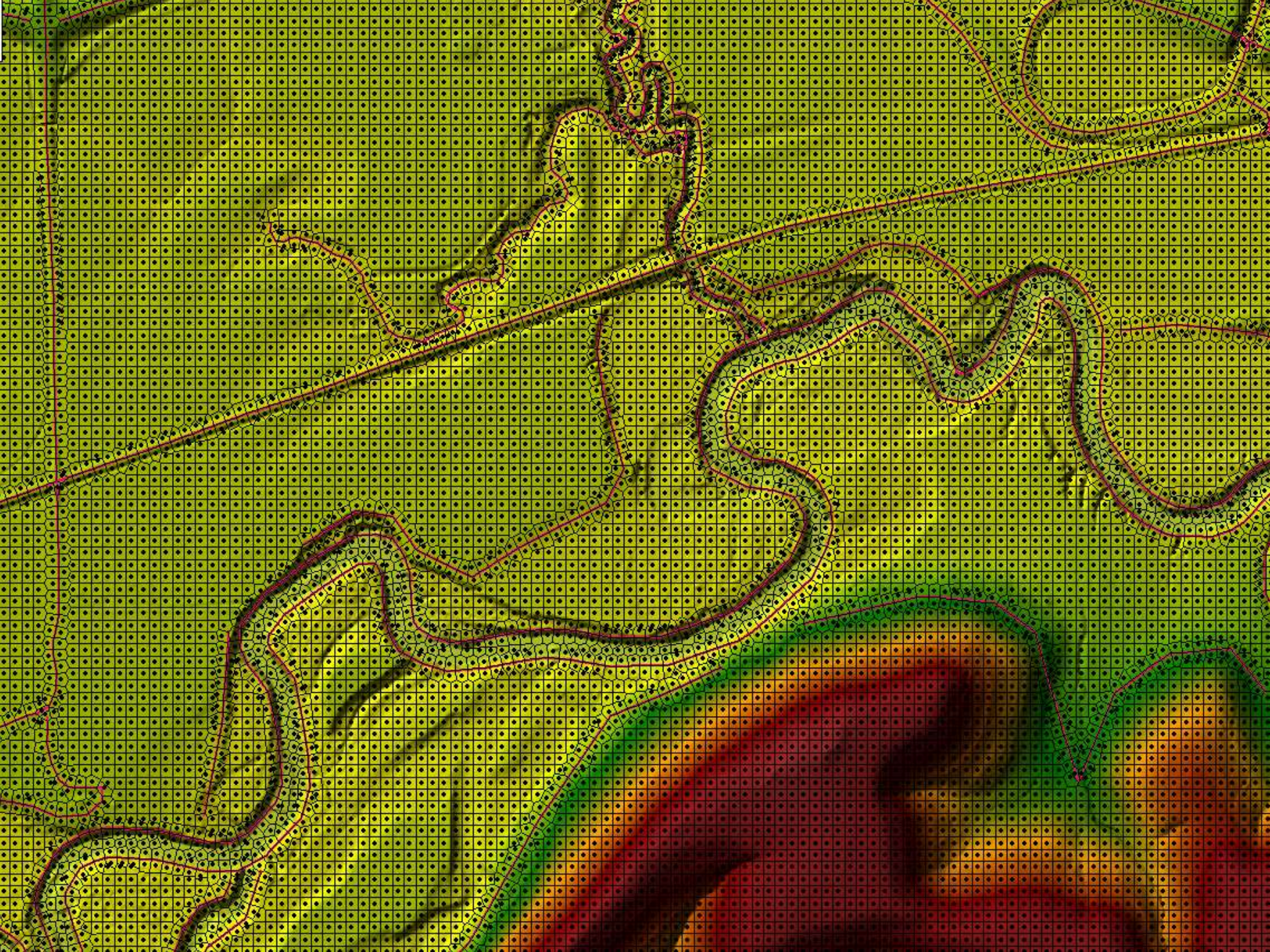
Hydraulics

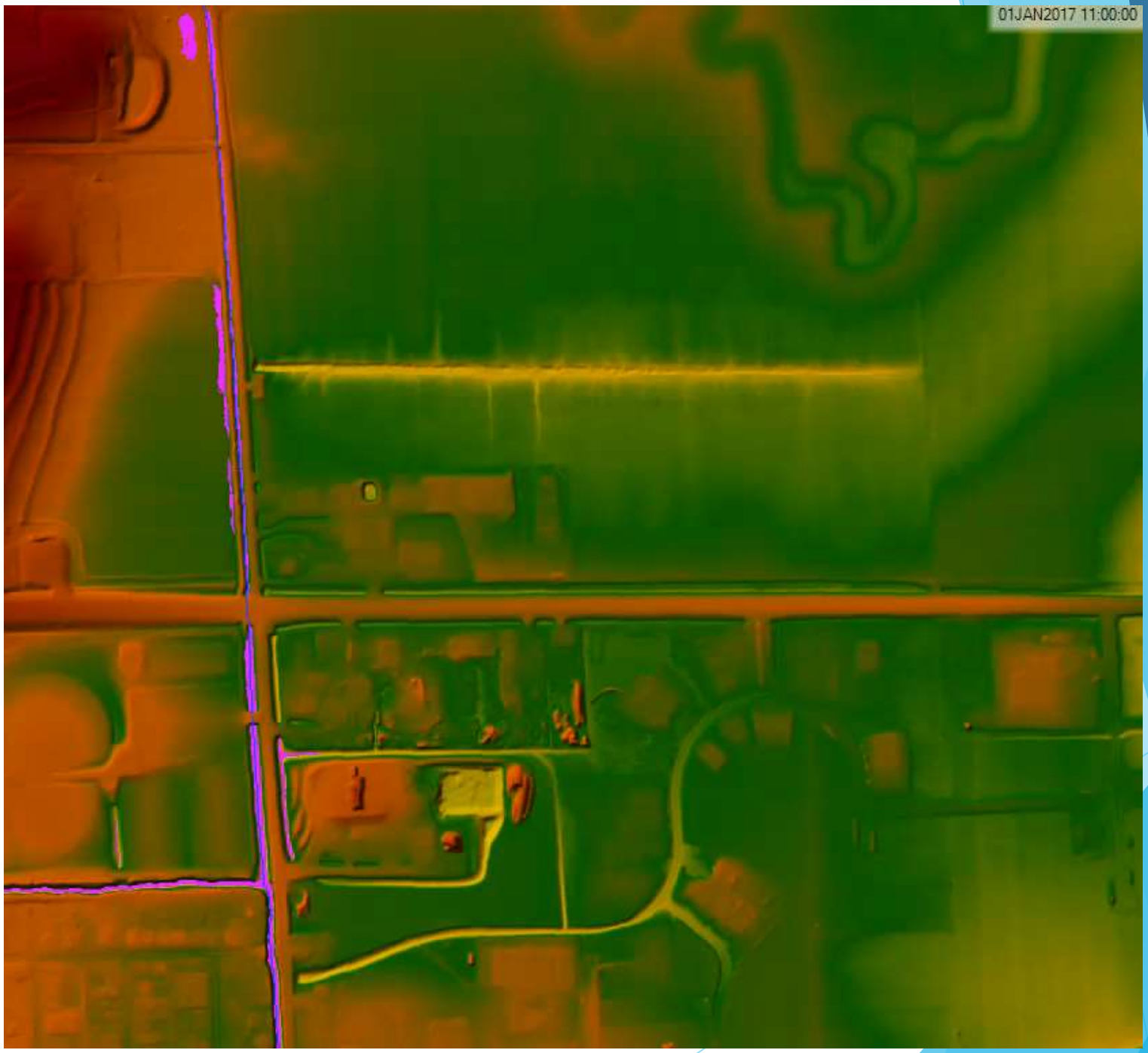
Limited Detailed Hydraulics:

- A 2D Hydraulic Mesh is used in the modeling
- Field Measured Structure data is included in the modeling
- Variables that will affect the conveyance of water are considered in the model
  - Slope, Friction, Sinuosity

Approximate Hydraulics:

- A 2D Hydraulic Mesh is used in the modeling
- Variables that will affect the conveyance of water are considered in the model
  - Slope, Friction, Sinuosity

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Hydraulic Methods

- **Detailed Hydraulics**
  - Utilizes Cross Sections
  - Structure data is surveyed
  - Typically in urban areas
  - Floodway included on map
  - Expensive
- **Limited Detailed Hydraulics**
  - Utilizes a 2D Hydraulic Mesh
  - Structures are field measured
  - No Floodway on map
- **Approximate Hydraulics**
  - Utilizes a 2D Hydraulic Mesh
  - Structures are not included in models
  - Typically in rural areas
  - No Floodways

Lower Cottonwood Project Overview

- New Detailed Hydraulics (Zone AE with floodway)
  - 5.5 miles (Streams near Emporia)
    - Rainfall Runoff Hydrology
    - 1D Hec-Ras Hydraulic Modeling
- Limited Detailed Hydraulics (Zone AE w/o floodway)
  - 17.6 miles (Cottonwood River near Cedar Point, Elmdale, Strong City, and Cottonwood Falls)
    - Gage Analysis Calibrated Hydrology
    - 2D Hec-Ras Hydraulic Modeling
  - 6.2 miles (Streams near Strong City and Cottonwood Falls)
    - Rainfall Runoff Hydrology
    - 2D Hec-Ras Hydraulic Modeling

Lower Cottonwood Project Overview

- **Approximate Hydraulics (Zone A)**
  - 91 miles (Cottonwood River, Cedar Creek, and Middle Creek)
    - Gage Analysis Calibrated Hydrology
    - 2D Hec-Ras Hydraulic Modeling
  - 1,079 miles
    - Rainfall Runoff Hydrology
    - 2D Hec-Ras Hydraulic Modeling
- **Digital Incorporation**
  - 40.4 miles (Cottonwood River in Lyon County)
    - Incorporate New Study, developed as a LOMR project for the City of Emporia, with new studies.
- **Redelineation**
  - 38.8 miles (Streams near Emporia)
    - Re-map existing water surface elevations on new LiDAR

Lower Cottonwood 2017 Mapping Updates

Scoped Studies

New Zone A - Gage Analysis
New Zone A studies will be developed for these streams using Gage Analysis calibrated hydrology and Hec-Ras 2D hydraulics.

New Zone A - Rainfall Runoff
New Zone A studies will be developed for these streams using Rainfall Runoff hydrology and Hec-Ras 2D hydraulics.

New Zone AE- Limited Detail Study (LDS) - Gage Analysis
New Zone AE without floodway studies will be developed for these streams using Gage Analysis Calibrated hydrology, and field-measured structure data included in the 2D HEC-RAS hydraulics models. No floodway will be shown on the maps, but Base Flood Elevations will be shown.

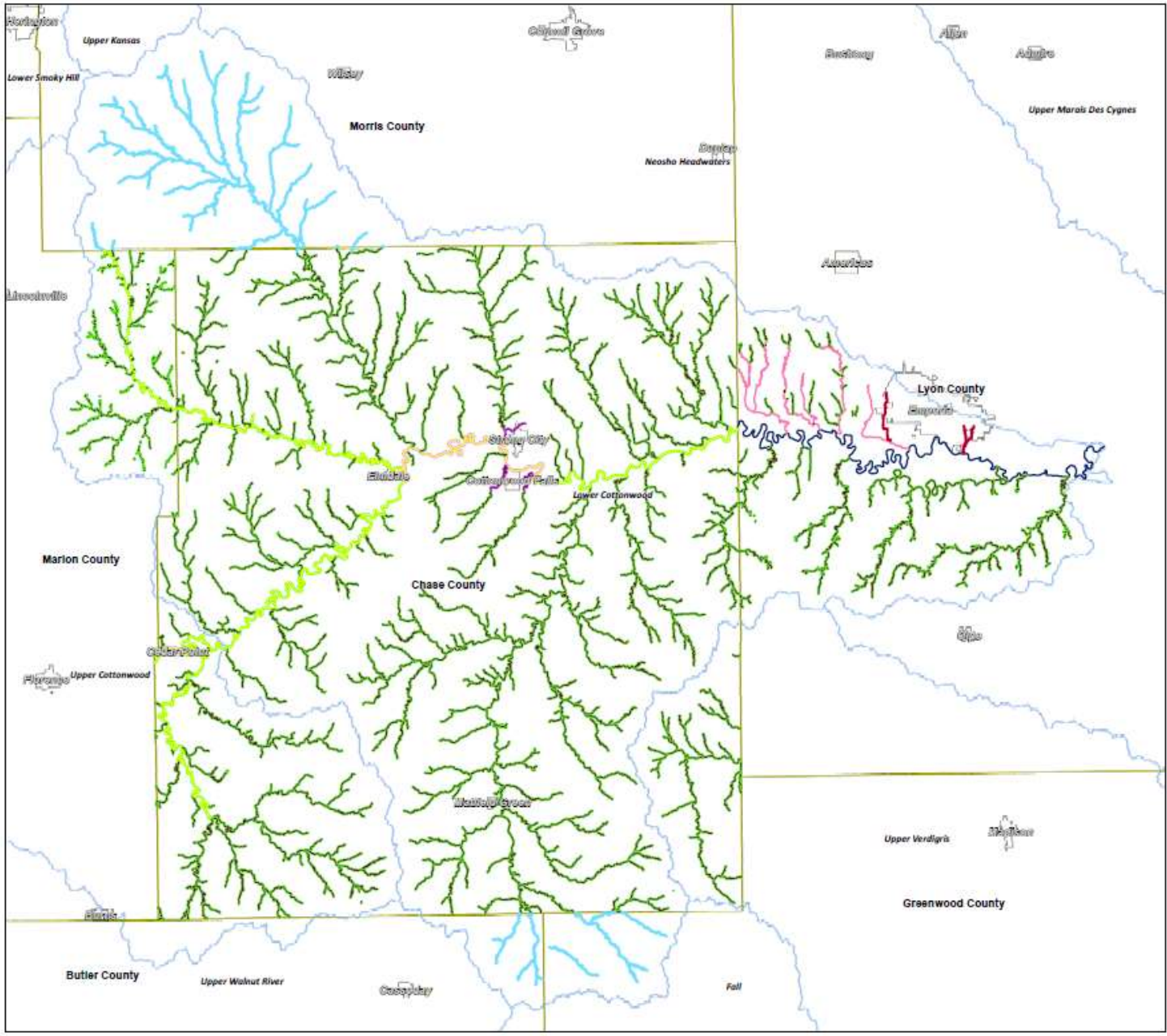
New Zone AE- Limited Detail Study (LDS) - Rainfall Runoff
New Zone AE without floodway studies will be developed for these streams using Rainfall Runoff hydrology, and field-measured structure data will be included in the 2D Hec-Ras hydraulics model. No floodway will be shown on the maps, but Base Flood Elevations will be shown.

New Zone AE - Rainfall Runoff
New Zone AE studies will be developed for these streams using Rainfall Runoff hydrology. Survey data will be collected and 1D Steady State Hec-Ras will be used for hydraulics. Floodways will be developed.

Zone AE - Redelineation
Existing Zone AE studies for these will not be restudied, but the water surface elevations will be re-mapped on newer LiDAR topography, creating updated boudaries for the Special Flood Hazard Area.

New Zone AE, Existing Study
New study exists for the Cottonwood River, developed as a LOMR project for the City of Emporia. This study will be incorporated with the new studies developed.

No New Study
No new studies proposed for these streams.



0 2.5 5 10 Miles

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Project Scope Review

- Look at and understand the scope planned for your community.
- You have a 30 day period to review and comment on the scope if necessary.
- **Is the scope appropriate?**
- **Are we missing anything?**

Project Phases

- **Information Submission**
  - You are the community experts - what do you have that we can use?
  - **Email Survey**
- **Data Development**
  - Fall 2017 thru Fall/Winter 2018
- **Community / Public Review**
  - Fall 2018 thru Spring/Summer 2019
- **Preliminary and Post-Preliminary**
  - Fall 2019 to Early 2020

What Should Working Groups DO?

- Stay aware and answer questions
- Identification of Areas of Concern (first task)
- **ENGINEERING AND MAP REVIEW**
- **PUBLIC REVIEW NOTIFICATION**
  - Inform public of map review opportunity
  - Encourage public participation
- **PLAN PUBLIC OUTREACH**
  - Public Open House
    - When, where, how, get the word out
  - Long Term Outreach

Preliminary Map Status

- **VERY IMPORTANT!!!!!**
  - Things change when status changes from DRAFT to PRELIMINARY.
- **DRAFT = OUR MAP**
  - Changes can be made to mapping through simple cooperation.
- **PRELIM = FEMA's MAP**
  - Changes can only be made through official appeal
- **NEED TO BE SOLID BEFORE PRELIMINARY**
- Preliminary Date Estimate
  - Summer/Fall 2019
  - We have control over Prelim Date (within reason)

Post-Preliminary Process

- Post-Prelim lasts 15-18 months in general
- Changes to mapping can only happen during a 90-day appeal period following Prelim status.
- Official meetings with community officials to explain timeline and appeal period. (CCO)
- Letter of Final Determination (LFD)
  - Point at which no more changes can be made
  - “Pencils Down” – map is final
- 6-month official adoption period between LFD and the Effective Date.

Post-Preliminary Working Group Tasks

- **Community Outreach**
  - Appeal Period Notification
  - Answer Stakeholder Questions
  - Insurance Outreach
    - Newly Mapped Procedure
- **Mitigation Planning**
  - **Community Rating System (CRS)**
    - Flood Insurance Discount$
  - **Can your community take action to reduce flood risk?**
    - Projects?
    - Grant Applications?
    - Best way to reduce floodplain map impacts is to reduce flood risk!

Communication to Working Groups

- **Email List**
  - Provide names, addresses, and titles
  - Will be main source of project updates
- **Project Updates**
  - Minimum of quarterly
  - When important milestones are reached
  - When action is necessary (reminders)
- **Meetings**
  - In person as needed
- **DON'T HESITATE TO CALL OR EMAIL, WE ARE AVAILABLE**

If You Only Remember A Few Things

- **Process is going to take time**
  - Maps will not take effect until 2019 or 2020
- **Get it right before Preliminary!**
  - Foster public review this fall
  - Get out the word and encourage participation
- **You need ownership of your regulatory map**
- I am available to answer your questions
- Point of Contact

Q & A

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